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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,224	01/03/2006	Zhengfu Han	U24.12-0002	1039

27367 7590 07/24/2008
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EXAMINER	
LAMB, CODY W	

ART UNIT	PAPER NUMBER
2613	

MAIL DATE	DELIVERY MODE
07/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/563,224	HAN ET AL.	
	Examiner	Art Unit	
	Cody W. Lamb	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 January 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/03/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: page 1, line 5 which should read "and a quantum computation network system", page 1, line 14 which should read "new scientific field which started in the 1990's", etc.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4-10 are objected to under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Naoki Shimosaka et al. (US Patent No. 5,327,276), referred herein as Shimosaka.

Regarding claim 1, Shimosaka teaches a method of addressing in quantum network which includes at least three nodes, comprising steps of: appointing each node an address serial number (column 4, lines 8-11 teach an address for a given destination node); sending photon signals with different wavelengths from each node to other nodes (column 4, lines 30-36 teach sending signals with different wavelengths $\lambda 1 - \lambda 4$ from each node to other nodes), wherein each of the photon signals regards signal

source wavelength and node address as an addressing badge (column 4, lines 27-30 teach that the wavelengths are used as a label for addressing the nodes), said addressing badge is made up of two parts: one part is determined by the wavelength of the photon signal which the node sends (column 4, lines 29-30 teach an addressing wavelength), and the other part is determined by the address serial number of the node (column 4, lines 8-11 teach a destination address for each node in the packet headers); and determining, by each node, where the photon signals come from by using the addressing badges of the photon signals (column 4, lines 36-40 teach a third node recognizing the first node via the address wavelength label, or badge).

Regarding claim 3, Shimosaka teaches the limitations of claim 1. Shimosaka further teaches a method wherein said photon signal is optical quantum state signal, or classical optical signal (column 4, lines 27-30 teach a conventional optical signal for the communication between node).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimosaka in view of Magnus Oberg (US Patent No. 5,963,348), referred herein as Oberg.

Regarding claim 2, Shimosaka teaches the limitations of claim 1. However, Shimosaka does not teach a method wherein when the number of nodes in the network is odd, the number of said signal source wavelengths is N; when the number of nodes is even, the number of said signal source wavelengths is N-1, where N is the number of nodes in the network. It is known in the art that the number of wavelengths in a network can be reduced if there are an odd number of nodes in the network. For example, Oberg teaches a system wherein the number of wavelengths in an odd-numbered node system is equal to the preceding even number (column 3, lines 11-15 teach subtracting 1 from the square of the number of nodes if the number is odd, but not if it is even). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the teaching of Shimosaka with the reduction of wavelengths for an odd numbered of nodes as taught by Oberg for minimizing the number of channels and exploiting their reuse (column 3, lines 9-15 teach this advantage).

10. Claims 4, 6, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimosaka in view of David Danagher et al. (US Patent No. 5,959,749), referred herein as Danagher.

Regarding claim 4, Shimosaka teaches the limitations of claim 1. Shimosaka further teaches a quantum network router comprising: a photon signal allocator

including N sets of optical components, one end of each optical component is mix-wavelength interface (figure 5, item 13 illustrates an input terminal receiving a mixture of wavelengths), and the other end includes separate wavelength interfaces (figure 5, item 14 illustrates an end with a separate wavelength interface for a single wavelength); an external interface comprising mix-wavelength interfaces of optical components (figure 5, item 16 illustrates an output with a mixture of wavelengths,); wherein the number of separate wavelength interfaces is at least N-1 (there are N wavelengths, where N is the number of nodes, as explained in column 4, lines 30-32, which is one greater than N-1), every separate wavelength interface transmits different photon signals with different wavelengths (figure 6 illustrates a tunable filter that transmits a photon signal of a certain wavelength, as explained in column 5, lines 22-32), and separate wavelength interfaces of different optical components, which transmit the same wavelength signals, connect one to one (figure 5, item 400 illustrates a switch which connects N of the wavelengths at the input terminal 13 to the output terminal at 16, with one wavelength having its signal swapped). However, Shimosaka does not teach the signal allocator including N optical component sets where N is equal to the number of nodes in the network. It is known to use multiple components, one for each node of the network. For example, Danagher teaches a system wherein there are components in a switch for each adjacent node that route signals appropriately (column 3, lines 26-42 and column 8, lines 11-19 teach a router for routing the traffic with an optical component, in this case a demultiplexer, for each node). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the

teaching of Shimosaka with the multiple optical components of Danagher for routing optical signals in a network of nodes configured as a star network (column 8, lines 11-13 teach this advantage).

Regarding claim 6, Shimosaka and Danagher teach the limitations of claim 4. Shimosaka further teaches a quantum network router wherein said optical component is made up of integrated or separate dispersive and accessorial passive optical components (column 5, lines 22-26 teach an optical filter as the component).

Regarding claim 7, Shimosaka and Danagher teach the limitations of claim 4. Danagher further teaches a quantum network router wherein said optical component is reversible wavelength division multiplexer (column 8, lines 11-19 teach the components as bidirectional, or reversible, WDMs). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to further include Danagher's teaching of a bidirectional WDM for routing since WDMs are well-known parts and are readily available for use in optical networks, the immediate advantage being for routing optical signals in a network of nodes configured as a star network (column 8, lines 11-13 teach this advantage).

Regarding claim 8, Shimosaka and Danagher teach the limitations of claim 4. Shimosaka further teaches a quantum network router wherein said optical connection is achieved via fiber, wave-guide, free space or other optical medium (column 4, line 34 teaches a fiber transmission line).

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimosaka and Danagher in view of Oberg.

Regarding claim 5, Shimosaka and Danagher teach the limitations of claim 4. However, they do not teach a quantum network router wherein when N is even, said separate wavelength interfaces of each optical component are the same, and the total number of wavelengths used in the whole quantum network router is N-1; when N is odd, any two optical components have one different separate wavelength interface, and the total number of wavelengths used in the whole quantum network router is N. It is known in the art that the number of wavelengths in a network can be reduced if there are an odd number of nodes in the network. For example, Oberg teaches a system wherein the number of wavelengths in an odd-numbered node system is equal to the preceding even number (column 3, lines 11-15 teach subtracting 1 from the square of the number of nodes if the number is odd, but not if it is even). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the teaching of Shimosaka with the reduction of wavelengths for an odd numbered of nodes as taught by Oberg for minimizing the number of channels and exploiting their reuse (column 3, lines 9-15 teach this advantage).

12. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimosaka and Danagher in view of Ann Dennis et al. (US Patent No. 5,539,560), referred herein as Dennis.

Regarding claim 9, Shimosaka and Danagher teach the limitations of claim 4. However, they do not teach a quantum network router wherein said optical connection can add collimating, coupling or reflecting optical passive components in the optical path to improve the optical capability of the connection. It is well known to use coupling

elements in routers. For example, Dennis teaches an optical coupler in a router (column 4, lines 53-56 teach an optical coupler in a router). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the teachings of Shimosaka and Danagher with the optical coupler of Dennis for connecting fibers to switches in a router (column 4, lines 53-56 teach this advantage).

Regarding claim 10, Shimosaka and Danagher teach the limitations of claim 4. However, they do not teach a quantum network router wherein said optical components of the whole quantum network router, include dispersive, collimating, orienting or coupling components, are integrated with wave-guide substrate totally or partially. It is well known to use coupling elements in routers. For example, Dennis teaches an optical coupler in a router (column 4, lines 53-56 teach an optical coupler in a router that is integrated with it). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the teachings of Shimosaka and Danagher with the optical coupler of Dennis for connecting fibers to switches in a router (column 4, lines 53-56 teach this advantage).

Conclusion

13. Any response to this Office Action should be faxed to (571) 273-8300 or mailed to:

Commissioner for Patents,
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cody W. Lamb whose telephone number is (571)270-1797. The examiner can normally be reached on Monday - Friday 8 a.m. - 5 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cody W. Lamb/

Examiner, Art Unit 2613
18 July 2008

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613